www.apcc.com

Note!

When managed by PowerChute UPS software the Redundant Switch should be used with Servers running Windows NT.

Smart-UPS Redundant Switch User's Manual

English

990-0275A, Revision 2 5/98

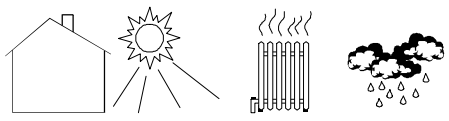
Initial Start-Up

To obtain warranty coverage, please fill out and return the warranty registration card now.

Inspection

Inspect the Redundant Switch upon receipt. Notify the carrier and dealer if there is damage. The packaging is recyclable; save it for reuse or dispose of it properly.

Placement



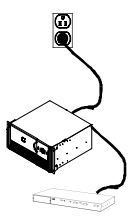
✓ ✗ ✗ ✗

Install the Redundant Switch in a protected area that is free of excessive dust and has adequate air flow. Do not operate the Redundant Switch where the temperature and humidity are outside the specified limits.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the warranty.

Installation

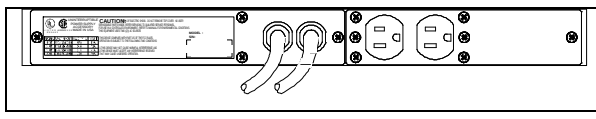
This Redundant Switch is equipped with a SmartSlot for additional manageability. See the APC Website (www.apcc.com) for information on plug-in accessories.



1. Install Redundant Switch

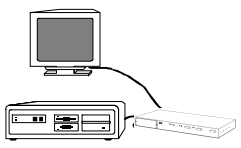
- Before plugging in the unit, install any compatible SmartSlot accessory. Refer to the ***Release Notes*** found in the CD included with the Redundant Switch for detailed information. Follow the installation instructions that come with the accessory.

Rear View



Model	Voltage	Source	Load
SU041	120 V	5-15	5-15

- Plug the power cords attached to the Redundant Switch into each UPS.
- Follow the UPS installation instructions in the ***Smart-UPS Quick Reference Guide*** to install the UPS.
- Both UPS units should be the same sine-wave model.



2. Connect Equipment

- Do not power laser printers through the Redundant Switch.

Use your server's power cords to connect to the Redundant Switch.

Note: If you have more than two power cords to connect, use a power strip. APC recommends that you do *not* use a surge protective power strip.

- Install the PowerChute® ***plus*** communication cable between the Redundant Switch's server port and the server's serial port.
- Install the 940-1000A communication cable(s) between each UPS and the Redundant Switch. Make sure that the communications cable for the preferred UPS, UPS-A, and the power cord for UPS-A are connected to the same UPS.

3. Turn on all connected equipment

Press the ON switch of UPS-A to turn on your Redundant Switch and UPS-B. This will power-up connected equipment.

Note: To test whether the cabling is correct, shut off one UPS using its OFF button. If it turns back on, the cabling is correct. If not, swap the two UPS communication cables.

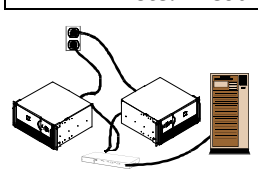
Storage

Store Redundant Switch covered and upright in a cool, dry location. Remove any accessories in the accessory slot and disconnect any cables connected to the server interface port.

Supported Configurations

Two connection configurations are supported for Redundant Switch. They are illustrated below.

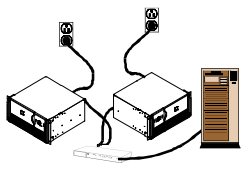
Note: Redundant Switch does not support communications with accessories installed in the UPS. Install the accessory you need in Redundant Switch.



Better Configuration: Smart-UPS Redundant Switch with two Smart-UPS units connected to one AC line.

This configuration is the minimal acceptable, since both UPS units depend on one facility power source.

Note: Both UPS units should be the same sine-wave model.



Best Configuration: Smart-UPS Redundant Switch with two Smart-UPS units connected to two separate AC lines.

This configuration is better than the previous, since each UPS unit receives power from a separate facility power source.

Note: Both UPS units should be the same sine-wave model.

PowerChute® *plus* Configuration Procedure

1. Install PowerChute® ***plus*** following the instructions in the enclosed ***Software Installation Instruction Sheet.***

2. Start up PowerChute® ***plus***. By default, communication is to UPS-A.
3. Configure UPS-A according to your requirements.
4. Set the UPSID to UPS_A.
5. At the Redundant Switch front panel, set the Source Preference to Source B.
6. Restart the computer on which PowerChute® ***plus*** is installed.
7. Restart PowerChute® ***plus***. Communication is to UPS-B.
8. Configure UPS-B to be identical to UPS-A except
   - UPS-B should be set to not perform self-tests.
   - Set the UPSID to UPS_B.
9. At the Redundant Switch front panel, set the Source Preference to Source A.
10. Restart the computer on which PowerChute® ***plus*** is installed.
11. Restart PowerChute® ***plus***. Communication is now to UPS-A.

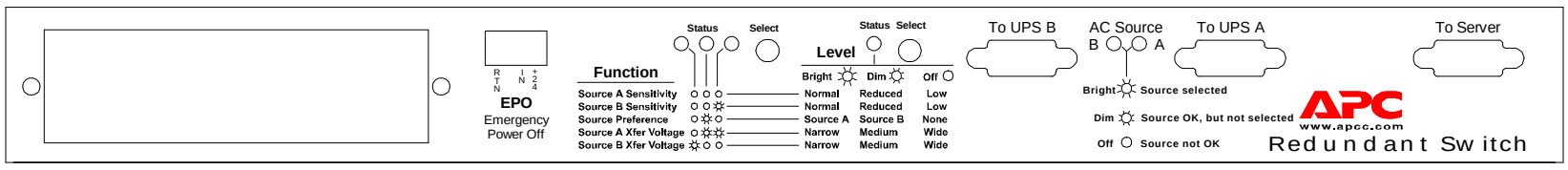
Notes

High availability is the condition in which both UPSs are available to supply AC power. Standard availability is when only one UPS is fully available for back up power. A loss of power to either input of Redundant Switch results in a "self test failed: invalid test" message from PowerChute which indicates a change from high availability to standard availability.

If UPS-A fails, Redundant Switch senses this and transfers the load's AC power input and PowerChute communication to UPS-B. During a transfer from one source to the other Redundant Switch is designed to interrupt communications with PowerChute® *plus* for three seconds (forcing a "lost comm" event through PowerChute) . PowerChute® *plus* then attempts to re-establish communications (with the available UPS). You are notified that the server AC power has gone from high availability to standard availability when PowerChute® *plus* records the following message:
Alternate UPS engaged or lost comm. Examine Redundant Switch for details.
When the selected UPS self-tests, Redundant Switch switches to the other UPS, causing a self-test of that UPS, then switches back.

Operating Instructions

Front View



Note: Only the Factory Default settings shown below should be used. Check that these are the current settings for your unit. Additional setting are for future upgrades.

Function	Factory Default	User Selectable Choices			Description
		LED Bright	LED Dim	LED Off	
Source A Sensitivity	Reduced	Normal	Reduced	Low	Sets transfer sensitivity to line conditions
Source B Sensitivity	Reduced	Normal	Reduced	Low	Sets transfer sensitivity to line conditions
Source Preference	Source A	Source A	Source B	None	Selects the preferred AC source
Source A Xfer Voltage	Medium	Narrow	Medium	Wide	Sets the transfer voltage window
Source B Xfer Voltage	Medium	Narrow	Medium	Wide	Sets the transfer voltage window

Emergency Power Off

The UPS may be switched off by a remotely operated Emergency Power Off (EPO) control. Such a configuration is common in computer rooms and laboratories where, for safety reasons, power to the loads must be disconnected. To connect Redundant Switch and its attached Smart-UPS to your emergency power off system, use the **EPO** connector. Use a normally-open contact to connect the +24 terminal to the IN terminal. A certified electrician can wire the external blue four-pin female connector to the emergency power off system. If this is done, and the emergency power off system is activated, neither UPS will go on-battery.

Cautions

- **The EPO interface is a Safety Extra Low Voltage (SELV) circuit and may be connected only to other SELV circuits.**
- **The EPO interface is designed to monitor circuits that have no determined voltage potential. Such closure circuits may be provided by a switch or relay properly isolated from the utility. Connection of the EPO interface to any circuit other than a closure type circuit may cause damage to the Redundant Switch.**

Front Panel User Programming

User programmable settings are accessible using controls located on the Redundant Switch front panel.

○ ○ ○ Function Select LED Indicator

The three green **Function Select** LEDs indicate which user programmable parameter is selected for status display or modification. Use the left **Select** button to cycle through the five user configurable items listed above.

○ Function Status LED Indicator

The green **Function Status** LED indicates the state of the selected user programmable function. Use the right **Select** button to cycle among the choices.

B ○ ○ A AC Source LED Indicator

The green on-line LED indicates the line quality and select status of each source: Bright = source selected; Dim = source okay, not selected; Off = source not okay; 1 second flashing of 1 LED, other LED off = both AC sources are out of tolerance.

Source Sensitivity

Generators connected to the Redundant Switch are ***not*** supported. However, Redundant Switch detects line voltage distortions such as spikes, notches, dips, and swells, as well as the distortions inexpensive fuel-powered generators typically produce. By default, the UPS reacts to distortions by transferring to on-battery operation to protect the loads. Where power quality is poor, Redundant Switch will change from the primary source UPS to the alternate UPS. If the loads can operate normally under such conditions, battery capacity and service life may be conserved by reducing the sensitivity of the UPSs, and setting the Source A and Source B Sensitivity to Low on the Redundant Switch.

Troubleshooting Redundant Switch

Problem	Possible Cause	Corrective Action
Redundant Switch will not turn on.	Very low or no utility voltage.	Check the AC power supply to the Redundant Switch with a table lamp. If very dim, have the utility voltage checked. Check that AC plugs are properly connected between Redundant Switch and the UPSs.
Server cannot communicate with attached UPS through Redundant Switch.	Communications cabling problem or internal Redundant Switch fault.	Check the three communication cable connections. If they are tight and there is still no communication, connect the server directly to a UPS. If there is now communication, there is an internal Redundant Switch fault. In any case, Contact APC customer service (see ***Service*** section).
All Redundant Switch LEDs are flashing.	Internal, automated self-test failure: defective unit	See ***Service*** section, below.

For Computer Interface Port Specifications, see the APC Website (www.apcc.com).

Service

If the Redundant Switch requires service do not return it to the dealer!

Follow these steps:

1. Use the ***Troubleshooting*** section to eliminate common problems.
2. If the problem persists, call customer service or visit the APC Internet Website (www.apcc.com).
   - Note the model number of the Redundant Switch, the serial number, and the date purchased. A technician will ask you to describe the problem and try to solve it over the phone, if possible. If this is not possible the technician will issue a Return Merchandise Authorization Number (RMA#).
   - If the Redundant Switch is under warranty, repairs are free. If not, there is a repair charge.
3. Pack the Redundant Switch in its original packaging. If the original packing is not available, ask customer service about obtaining a new set.
   - Pack the Redundant Switch properly to avoid damage in transit. Never use Styrofoam beads for packaging. Damage sustained in transit is not covered under warranty.
   - Include a letter with your name, RMA#, address, copy of the sales receipt, description of the trouble, your daytime phone number, and a check (if necessary).
4. Mark the RMA# on the outside of the package.
5. Return the Redundant Switch by insured, prepaid carrier to the address given to you by Customer Service.

North & Latin America	Europe
APC **132 Fairgrounds Road** **West Kingston, Rhode Island 02892 USA** **1-800-800-4APC/1-401-789-5735**	**APC** **Ballybritt Business Park** **Galway, Ireland 10800-702000** **353-91-702020**
Internet: http://www.apcc.com	
E-Mail: **North America:** apctech@apcc.com **Latin America:** apctchla@apcc.com	**E-Mail:** apceurtech@apcc.com

Troubleshooting the High Availability System

Problem/Severity (1=low, 4=high)	High Availability System Response	PowerChute *plus* Response	Corrective Action
UPS-B communications problem. Severity = 1	Load not interrupted; PowerChute ***plus*** self-test reports error.	Either: • self-test at UPS failed, invalid test • unable to communicate with UPS	Diagnose communications path to Redundant Switch.
UPS-A communications problem. Severity = 2	Load not interrupted; Redundant Switch checks communications continuously.	PowerChute ***plus*** alerted immediately. Either: • self-test at UPS failed, invalid test • unable to communicate with UPS	Initiate Self-Test through PowerChute ***plus***. Diagnose UPS-A.
UPS-B loses ability to deliver load if engaged. Severity = 3	Load not interrupted; Redundant Switch and PowerChute ***plus*** monitor continuously.	PowerChute ***plus*** alerted immediately. Either: • self-test at UPS failed, invalid test • unable to communicate with UPS	Initiate Self-Test through PowerChute ***plus***. Diagnose UPS-B.
UPS-A drops output voltage Severity = 4	Load not interrupted; Redundant Switch checks continuously. Redundant Switch engages UPS-B for load delivery and communications proactively.	PowerChute ***plus*** alerted immediately. Either: • self-test at UPS failed, invalid test • alternate UPS engaged or lost comm. View Redundant Switch display for details.	Initiate Self-Test through PowerChute ***plus***. Diagnose both UPS units.

Specifications

Acceptable input voltage	120 VAC: 0 - 165 VAC
Output voltage	120 VAC: 108 - 132 VAC (by default)
Frequency limits (on-line operation)	50 or 60 Hz, ±5%
Transfer time	6 ms typical
Maximum load	1400 VA 12 A
Operating temperature	0 to +40 ºC (+32 to +104 ºF)
Storage temperature	-15 to +45 ºC (+5 to +113 ºF)
Operating and storage relative humidity	0 to 95%, non-condensing
Operating elevation	0 to +3,000 m (0 to +10,000 ft)
Storage elevation	0 to +15,000 m (0 to +50,000 ft)
Electromagnetic immunity	IEC 801-2, 801-3, 801-4
Audible noise in dBA @ 1 m (3 ft)	<45
Size (H x W x D)	4.45 x 43.2 x 19 cm (1.75 x 17.0 x 7.5 in.)
Weight - net (shipping)	4.5 (6.8) kg/10 (15) lb.
Safety approvals	Listed to UL 1778, certified to CSA 107.1
EMC verification	120 VAC: FCC Class A certified